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A Thermo-electric Cell of Constant Voltage. *By* C. R. DARLING.

(EXHIBITED AT THE MEETING ON JANUARY 23, 1920.)

THIS cell depends upon the constancy of the E.M.F. developed by molten bismuth and aluminium over a wide range of temperature (Darling and Grace, " Proceedings," Vol. XXIX. Part I.). An iron vessel is provided with a side branch of silica tubing, about 10 in. long, both being filled with bismuth. An aluminium wire covered with graphite passes through the lid of the vessel into the molten bismuth, and forms the hot junction, the cold junction being similarly formed at the remote end of the silica tube, and kept in oil in a vacuum flask. On placing a burner beneath the vessel the E.M.F. rises to 15 micro-volts at the melting point of bismuth (267°C.), the cold junction being at 15°, at which voltage the cell remains constant over a further 300°. It has been found useful as a closely approximate standard in measuring thermal E.M.F.s, and as a " set-up " against another E.M.F. when using a pyrometer indicator for measuring special ranges. The internal resistance of the instrument exhibited is approximately 0·5 ohm.